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STUDIES IN THE GENERA OF THE *DIOSMEAE* (RUTACEAE): 7.

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ABSTRACT

Acmadenia laevigata Bartl. & Wendl. is described afresh as *Euchaetis meridionalis. Euchaetis laevigata* Turcz. (= *Acmadenia assimilis* Sond.) is redescribed in order to clarify its difference from *Euchaetis meridionalis*. Two new species of *Euchaetis*, four new species of *Acmadenia* and one new species of *Macrostylis* are described. *Diosma wittebergensis* is transferred to the genus *Acmadenia*.

UITTREKSEL

STUDIES IN THE GENERA VAN DIE *DIOSMEAE* (RUTACEAE): 7

Acmadenia laevigata Bartl. & Wendl. word as *Euchaetis meridionalis* opnuut beskryf. *Euchaetis laevigata* Turcz. (= *Acmadenia assimilis* Sond.) word weer beskryf om sy verskil van *Euchatis meridionalis* te beklemtoon. Twee nuwe *Euchaetis* soorte, vier nuwe *Acmadenia* soorte en een nuwe *Macrostylis* soort word beskryf. *Diosma wittebergensis* word by *Acmadenia* ingedeel.

Euchaetis meridionalis Williams, sp.nov. affinis *E. scabricosta* Williams sed costis paucioribus glanduloso-punctatis, foliis orbicularibus non lanceolatis, et capitulis ad basim in axilibus resiniferis differt.

Frutex ad 1,5 m, ad basim monocaulis. *Rami* numerosi, erecti, glabri, brevi. *Ramuli* numerosi, erecti, brevi, sparsim puberuli, dense foliosi. *Folia* ad 6 mm longa, 3,5 mm lata, elliptica vel orbiculares, obtusa, 4–5 faria, sub-complicata, breve petiolata, sub-imbricata, erecta, glabra, sparsim ciliolata, costis marginibusque pauci-glanduloso-punctatis. *Inflorescentia* terminilia, 5–6 nata. *Bractea* 4 mm longa, 2–3 mm lata, elliptia vel orbiculares, obtusa, glabra, sessilia, crassiuscula, intus ad basim resiniferis, marginibus anguste cartilagineis sparsim spinulosis. *Bracteolae* duae, 2,5 mm longae, 1,2 mm latae, sub-ellipticae, glabrae, ciliolatae, ad basim resiniferis. *Sepala* quinque, 2,5 mm longa, 2–2,3 mm lata, sub-elliptica, glabra, sparsim ciliolata. *Petala* quinque, 5,2 mm longa, 3,1 mm lata, sub-rosea vel alba, orbiculata, unguibus transverse barbatis, ciliatis. *Staminodia* quinque, vestigiala. *Fila* quinque, glabra, post anthesin 1,5 mm longa. *Antherae* quinque, 1,2 mm longae, 0,9 mm latae, roseae, apicibus minute glandulosis. *Pollen* 45–50 μ longum, 30–33 μ latum, oblongum. *Discus* ovarium excedens, viridus, nectarifer. *Stigma* 0,5 mm diam., capitatum. *Stylus* 1,4 mm longus, glaber, erectus. *Ovarium* 5-carpellatum, 1 mm diam., 0,9 mm longum, apicibus obtusis sparsim

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setulosis. *Fructus* 5-carpellatus, 7 mm longus, 4,5 mm diam., glaber, multiglandulosis, cornibus 2 mm longis, erectis. *Semen* 3,8–4,2 mm longum, 1,5 mm latum, piceum, nitens.

Type: CAPE—3420 (Bredasdorp): De Hoop behind sand dunes on track to Koppie Alleen, Bredasdorp Division (-AD), 14/4/1972, *Williams 1644* (NBG, holotype).

Acmadenia laevigata Bartl. & Wendl. (1824) is the earliest name that was applied to this species but the epithet "laevigata" cannot be transferred to *Euchaetis* due to the prior existence of the name *Euchaetis laevigata* Turcz. (1858). The name *Euchaetis meridionalis* is therefore proposed to embrace this taxon which is here described *de novo*.

Shrubs up to 1,5 m, usually much less, forming a dense rounded bush, single stemmed at base, sometimes in close mats. *Branches* numerous, erect, short, glabrous, di-trichotomous, somewhat rough with leaf scars. *Branchlets* numerous, erect, short, sparsely puberulous, densely foliate. *Leaves* up to 6 mm long, 3,5 mm broad, elliptic or orbicular, obtuse, sub-imbricate, erect, glabrous, 4–5 ranked, somewhat complicate; midrib prominent with 2 or 3 gland dots; margins narrowly cartilaginous, sparsely ciliolate with a few gland dots; petiole short. *Inflorescence* terminal, 4–6 nate, flowers pale pink to white. *Bract* leaf-like, 4 mm long, 2–3 mm broad, elliptic or orbicular, obtuse, glabrous, sessile, somewhat thick, exuding resin from numerous glands situated towards the axil; margins narrowly cartilaginous, sparsely ciliolate. *Bracteoles* two, 2,5 mm long, 1,2 mm broad, asymmetrically elliptic, glabrous, ciliolate, apex thickened and green, resiniferous below. *Calyx lobes* five, 2,5 mm long, 2–2,3 mm broad, sub-elliptic, glabrous, pinkish; apex thickened; margins broadly translucent below, sparsely ciliolate. *Petals* five, 5,2 mm long; *blade* 2,2 mm long, 3,1 mm broad, glabrous, pale pink to white; *claw* 3 mm long, 1,8 mm broad, transversely bearded and sparsely ciliate above. *Staminodes* five, vestigial or a stalked gland 0,2 mm long. *Filaments* five, becoming 1,5 mm long, glabrous, pale pink, acicular. *Anthers* five, 1,2 mm long, 0,9 mm broad, pink, apex with a minute gland. *Pollen* 45–50 μ long, 30–33 μ broad, oblong. *Disc* dark green, exudes nectar, curling inwards over the ovary. *Stigma* 0,5 mm diam., globose, dark green, capitate. *Style* becoming 1,4 mm long, glabrous, erect. *Ovary* 5-carpellate, 1 mm diam., 0,9 mm long; *lobes* obtuse with a few hairs towards the sides above. *Fruit* 5-carpellate, 7 mm long, 4,5 mm diam., surrounded for the most part by the persistent calyx and petals; *carpel* glabrous with many gland dots; *horn* 2 mm long, erect with a few hairs above, apex retuse with a gland. *Seed* 3,8–4,2 mm long including the white aril, 1,5 mm broad, black, shining.

SPECIMENS EXAMINED

CAPE—3420 (Bredasdorp): De Hoop, behind sand dunes on track to Koppie Alleen (-AD), 200 ft., 14/4/1972, *Williams 1644* (NBG); De Hoop, flats, limestone hills and along pass to Wydgelegen, 8/4/1957, *Lewis 5130* (BOL, NBG), 9/6/1970, *Esterhuysen 32461* (BOL), 10/3/1957, *Barker 8735* (NBG), –/7/1962, *Macpherson s.n.* (NBG), 5/2/1963, *Jordaan M227* (STE), c 100 ft., 28/7/1970, *v.d. Merwe 137* (STE); De Hoop, N. side of pass, 415 ft., 9/4/1974, *Williams 1888* (NBG); De Hoop, S. side of pass, 200 ft., 9/4/1974, *Williams 1890* (NBG), 175 ft., 27/11/1974, *Williams 1940* (NBG): Potberg, Elands Pad, near the coast (-BC), 100 ft., 12/4/1972, *Williams 1638* (NBG); Cape Infanta, Sebastian Bay (-BD), 28/9/1959, *Esterhuysen 28314* (BOL), 23/9/1947, *Walgate 874* (NBG), *Kunth s.n.* (MEL *52824*); Arniston, Wagenhuiskraal, Kliprug (-CA), 15/9/1944, *Henrici 3716* (BOL, NBG), 5/6/1900, *Fry s.n.* (GRA, PRE), 0–150 ft., 24/8/1962, *Taylor 3807* (PRE, STE), 90 ft., 20/9/1968, *Marsh 919* (PRE, STE), –/7/1933, *Jordaan s.n.* (STE *18672*); Dronkvlei, 100 ft., 26/8/1963 *van Breda 1636* (K, PRE); 3,4 miles N.W. of Skipskop (-CB), 100 ft., 22/6/1962, *Acocks 22268* (K, PRE); Skipskop behind the dunes, 50 ft., 9/4/1974, *Williams 1891* (NBG); Struis Bay near sea (-CC), 1/12/1933, *Salter 4104* (BM, BOL, K), 50 ft., 21/6/1972, *Williams 1661* (NBG); Cape Agulhas 2 miles east and rocks along coast, 16/9/1934, *Salter 4836* (BM, BOL, K), 5/8/1940, *Esterhuysen 2975* (BOL, GRA, K, NBG, SAM), 4/8/1940, *Compton 9081* (NBG); prope Zoutendals valley, –/10/–, *Ecklon & Zeyher 824*(S).

Without locality: *Scholl s.n.* (B-W *4784* as to r.-hand specimen), *Mundt s.n.* (SAM *30579* as to r.-hand specimen), *Guenzius s.n.* (W), *Sieber s.n.* (W). *(Ecklon & Zeyher 826* (S, SAM) from between Pampoenkraal and Paarl is an extremely doubtful locality).

DISTRIBUTION AND BIOLOGY

Euchaetis meridionalis occurs in a fairly narrow coastal area lying between Cape Agulhas and Cape Infanta usually close to the coast but, at only one point near Wydgelegen, reaching as far as thirteen kilometres from the sea. It is by no means rare and can form dense mats in exposed areas near to the sea *(Esterhuysen 2975)*. It is usually found at altitudes of from 15 to 60 m (50–200 ft.) above sea level, growing on limestone associated with the Bredasdorp geological series. It has been observed in bloom from April to December and ripe fruits have been collected from August to November. The small but conspicuous flowers, the sticky pollen and the presence of nectar indicate that this plant is most probably pollinated by insects. An assumption confirmed by the observation of honey bees visiting the flowers *(Williams 1638)*. Regeneration takes place, probably only after fires, from seed which has been ejected when ripe from the capsule by the usual catapult mechanism. The leaves, when crushed, have an odour reminiscent of cedar and may exhibit a whitish waxy exudate originating as a sticky resin near the axils of the young leaves. On farm lands the plants have been observed to have been grazed by stock *(Williams 1644, Henrici 3716)*.

VARIATION

It is quite noticeable that the leaves of plants from near the sea at Struisbaai are shorter and broader than those of the plants from further inland and that those from the farthest inland, near to Wydgelegen, are beginning to look very much like those of *Euchaetis scabricosta* indicating a very close relationship between these two species.

DISCUSSION

Because of the transversely bearded petals this plant may be regarded as a typical *Euchaetis*. It may be distinguished from *Euchaetis scabricosta*, as previously mentioned (Williams, 1974), having a midrib with fewer gland dots, leaves that are more obtuse, more crowded, shorter and broader, with a resinous exudate towards the leaf axils. Furthermore a recent gathering of *Euchaetis scabricosta (Williams 2181)* from near Bredasdorp has shown that, whereas *E. scabricosta* may regenerate after fires by sprouting from the rootstock just below ground level, *E. meridionalis*, being single stemmed at base, has never been observed to do this. A most notable difference between these two species is that *E. meridionalis* is only found on limestone whereas *E. scabricosta* is found in sandy soil.

REFERENCE

WILLIAMS, ION, 1974. *Jl S. Afr. Bot.* **40** (4): 286–289.

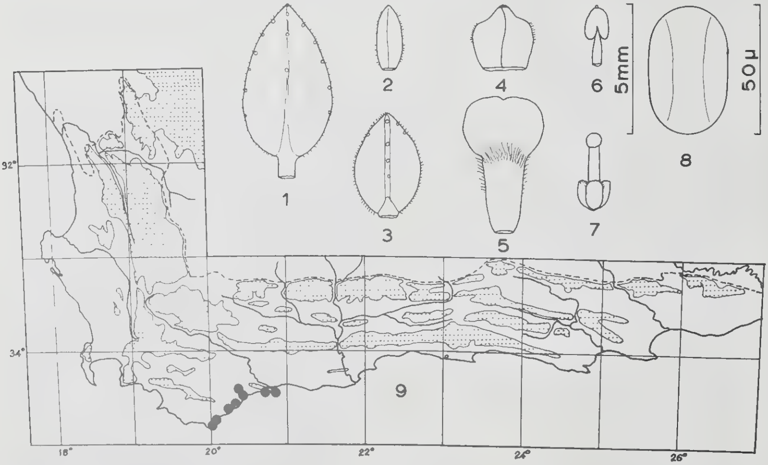

FIG. 1.
Euchaetis meridionalis: 1, leaf. 2, bracteole. 3, bract. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

Euchaetis laevigata Turcz. in *Bull. Soc. Imp. Nat. Mosc.* **31.** 1:438 (1858). Type: between Cape Agulhas and Potberg, on limestone hills, under 500 ft., 3/8/1831, *Drège IV, C, a, 2* (BM, E, K, MEL, P, S, isotypes).

Acmadenia laevigata E. Mey in Drège Zwei pflanzen. Doc.: 122, 161 (1844). nom. nud.

Acmadenia assimilis Sonder in Flor. Cap. **1:** 383 (1860). Type: as above.

It is most extraordinary to think that this plant collected by Drège in 1831 on limestone hills between Cape Agulhas and Potberg should have passed unnoticed until comparatively recently when Acocks gathered specimens on the north side of the limestone hills between Bredasdorp and Wydgelegen. Following Acocks' lead, further material was collected from quite near Bredasdorp, just beyond the lime quarry on the Swellendam road. It was found to be a perfect match with the specimens collected by Drège and named *Acmadenia laevigata* by E. Meyer. Sonder, unaware of Turcszaninov's paper, named Drège's plant *Acmadenia assimilis*, the name *Acmadenia laevigata* having been previously used by Bartling and Wendland for another taxon in this genus. Although Sonder's action was correct, local botanists were confused and for many years assigned plants found between Cape Agulhas and Potberg to *Acmadenia assimilis* in error. Because of this misidentification it has been deemed advisable to redescribe *Euchaetis laevigata* at the same time as publishing the description of *Euchaetis meridionalis* which now replaces *Acmadenia laevigata* B. & W. At the same time attention is drawn to the fact that the three species mentioned by Sonder: (11) *A. laevigata* B. & W., (12) *A. pungens* B. & W. and (13) *A. assimilis* Sond., considered by Sonder to belong in *Acmadenia*, all possess transversely bearded petals and rudimentary staminodes and have therefore been placed in *Euchaetis* under the names *E. meridionalis* Williams, *E. pungens* (B. & W.) Williams and *E. laevigata* Turcz. in that order.

DESCRIPTION

Shrubs up to 0,8 m tall, erect, forming a dense bush single stemmed at base. *Branches* erect, often dichotomous, slender, with a greyish bark becoming fairly smooth and leafless after about three seasons. *Branchlets* numerous, erect, slender, somewhat reddened, glabrous, except for some minute puberulence, often in opposite pairs. *Leaves* 2,8–3,6 mm diam., orbicular, sessile, 4-ranked, opposite, recurved-erect, glabrous, very sparsely and minutely ciliolate; apex with a blunt point; margins narrowly translucent and somewhat denticulate, subcomplicate with a distinct midrib and scattered oil glands; adaxial surface somewhat concave. *Inflorescence* terminal, with the white flowers in opposite pairs or fours below which the next years shoots emerge. *Bract* one to each flower, 2,5 mm long 1,6–2,4 mm broad, ciliolate, leaf-like. *Bracteoles* two 2,5 mm long, 1,3–1,6 mm broad, elliptic, obtuse, glabrous, keeled, apex thickened; margins minutely ciliolate and translucent below. *Calyx lobes* five, about 2,5 mm diam., asymmetrically orbicular, glabrous, minutely ciliolate, thickened and spreading at the apex; the margins broadly translucent below. *Petals* five, 4,5 mm long; *limb* 1,6–1,8 mm long, 2,2–2,5 mm broad, sub-orbicular, glabrous, pinkish-white; *claw* 2,5 mm long, 1,5 mm broad narrowing to 0,8 mm below, more or less translucent, transversely bearded above, ciliate, a few hairs down the prominent midrib. *Staminodes* five, vestigial, a minute gland about 0,1 mm long at most, situated low down on the outside of the disc. *Filaments* five, at first 0,5 mm long becoming 1,8 mm long after anthesis and placing the discharged anther outside the perimeter of the claws. *Anthers* five, 1 mm long before anthesis, reddish-orange, with a minute apical gland. *Pollen* 50–55 μ long, 28–30 μ broad, oblong. *Disc* minutely punctate, dark green, closes somewhat over the ovary, exudes nectar. *Stigma* 0,6 mm diam., globose, capitate. *Style* becoming 1,2 mm long, glabrous, erect, persisting. *Ovary* 5-carpellate, each carpel with a gland clasped at the apex and minute spiky lumps along adjacent edges. *Fruit* 5-carpellate, 5,5 mm long, about 3,8 mm diam., glabrous, smooth; *carpels* with about 6 gland dots along the margins and a few very short hairs above; *horns* 1 mm long or less, erect, clasping a small gland at the apex, equalling the persistent stigma. *Seed* (from *Williams 2025*) 2,7–3 mm long with the white aril produced a further 0,6 mm, 1,5 mm broad, black, shining.

SPECIMENS EXAMINED

CAPE—3420 (Bredasdorp): van der Stelskraal (-AC), 400 ft., 1/8/1968, *Acocks 24042* (PRE), 300 ft., 2/7/1972, *Williams 1662* (NBG); Soutpansvlakte, 8 miles E. of Bredasdorp, 340 ft., 4/6/1974, *Williams 1904* (NBG); 3 km N.E. of Bredasdorp on road to Swellendam (-CA), 300 ft., 21/11/1973, *Williams 1874* (NBG), 3/8/1975, *Williams 2025* (NBG); between Cape Agulhas and Potberg, on limestone hills, under 500 ft., 3/8/1831, *Drège IV, C, a, 2* (BM, E, K, MEL, P, S, isotypes).

DISTRIBUTION AND BIOLOGY

Euchaetis laevigata occurs quite frequently over a rather small area about 23 km long on the N side of the limestone ridge running NE from Bredasdorp at an altitude of 90–120 m (300–400 ft.) above sea level. It was found in full bloom in the middle of October but at other times only a few plants with flowers were seen and only one plant with fruits was found in August. It is possible that the extremely dry winters experienced at that time may have been the reason. The plant is single stemmed at base and apparently will not regenerate after fires from the stump so that one presumes that it can only regenerate from seed.

VARIATION

No variation or hybridisation had been observed but the plants at van der Stelskraal were the tallest and most healthy.

DISCUSSION

The transversely bearded petals and the vestigial staminodes indicate that this plant is a typical *Euchaetis*.

It differs from both *Euchaetis scabricosta* and *Euchaetis meridionalis* in having leaves that are always opposite with the midrib recurved, somewhat smaller, orbicular in outline with gland dots scattered and not just on midrib and margins. The shoots are dry without any trace of resin or wax.

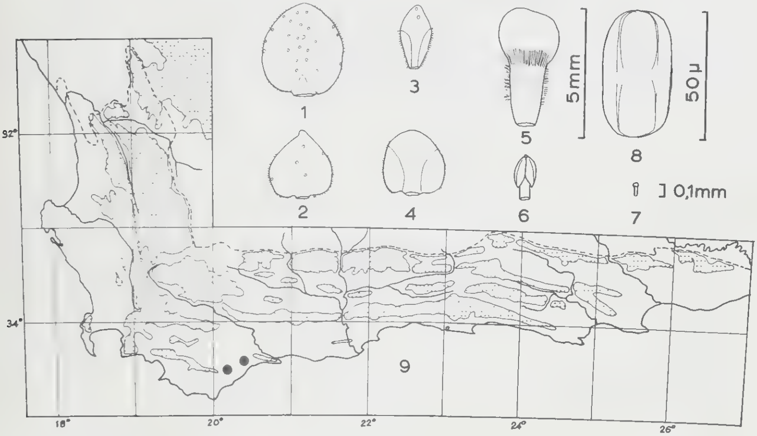

FIG. 2.
Euchaetis laevigata: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, staminode. 8, pollen. 9, distribution.

Euchaetis intonsa Williams, sp. nov., propria propter folia alterna elliptica sparsim pubescentia ciliata, bracteae bracteolae et sepala pubescentes, petala parva costis intus glabris.

Frutex 400 mm, ad basim monocaulis. *Rami* numerosi, erecti, glabrescenti, cinerei. *Ramuli* numerosi, erecti, puberuli, graciles, ex parte rubelli, foliosi, irregulariter alterni. *Folia* 4 mm longa, 2,2–2,4 mm lata, elliptica, sub-acuta, sub-erecta, pleurumque alterna; costis prominentibus, glanduloso-punctatis, sparsim pubescentibus, ad apex callosis; marginibus sparsim ciliatis, minute glanduloso-punctatis. *Inflorescentia* terminalis, sessilis, 3–4 nata. *Bractea* una, 2,7 mm longa, 1,1–1,7 mm lata, oblanceolata, obtusa, ciliata, sparsim pubescens. *Bracteolae* duae, 2,5 mm longae, 1 mm latae, oblongae, obtusae, ciliatae, pubescentes. *Sepala* quinque, 2,6 mm longa, 2 mm lata, asymmetrice oblonga, conspicua, purpurata, ciliata, sparsim pubescentia. *Petala* quinque, 3,8–4,2 mm longa; *limbus* 1,3–1,8 mm latus, sub-orbicularis, subroseus; *unguis* 0,8–1 mm latus, forte transverse barbata, ciliata. *Staminodia* quinque, 0,1 mm longa, vestigiala. *Filamenta* quinque, glabra, post anthesin 1,5 mm longa. *Anthera* quinque, 1 mm longa, 0,7 mm lata, aurantia. *Pollen* 52 μ longum, 30 μ latum, oblongum. *Discus* ovarium excedens, viridus, nectarifer. *Stigma* 0,6 mm diam., globosum, capitatum. *Stylus* 1,3 mm longus, glaber, erectus. *Ovarium* 5-carpellatum, 0,7 mm longum, 0,6 mm diam., apicibus obtusis, lateribus sparsim setulosis. *Fructus* 5-carpellatus, 6,5 mm longus, 4 mm diam., viridus; *cornibus* 1 mm longis, erectis, echinulatis. *Semen* 3,7 mm longum, arrilatum, 1,6 mm latum, piceum, nitens.

Type: CAPE—3420 (Bredasdorp): north side of pass from Wydgelegen to De Hoop, at base of limestone hills, on gently sloping ground in crevices and in shallow soil on limestone bedrock (-AD), 100 m (350 ft.), 3/8/1975, *Williams 2028* (NBG, holotype; K, MO, NSW, PERTH, PRE, S, STE, isotypes).

Euchaetis intonsa was apparently first collected by J. P. H. Acocks in December 1962.

Shrubs up to 400 mm tall forming a dense rounded bush if undisturbed, single stemmed at base. *Branches* fairly numerous, somewhat erect, smooth, glabrescent as the outer skin splits off, ashy grey. *Branchlets* numerous, erect, puberulous, reddened where exposed, fairly slender, well clothed with leaves, irregularly alternate. *Leaves* 4 mm long, 2,2–2,4 mm broad, smaller on branchlets, elliptic, sub-acute, sub-erect, alternate, sometimes 4-ranked on small shoots near the base of the plant; midrib prominent, gland-dotted, apex callused; abaxial surface sparsely pubescent mainly on the midrib; margins thick, sparsely ciliate, minutely gland-dotted; adaxial surface glabrous; petiole 0,5 mm long, adpressed, glabrous, pale. *Inflorescence* terminal, 3–4 nate, sessile; florets crowded, flowering simultaneously. *Bract* one to each flower, 2,7 mm long, 1,1–1,7 mm broad, oblanceolate, obtuse; apex thick, green, somewhat elevated; margins ciliate, translucent below; midrib prominent; abaxial surface sparsely pubescent, without gland dots. *Bracteoles* two, 2,5 mm long, 1 mm broad, oblong, obtuse; apex thick, green; margins ciliate; abaxial surface pubescent. *Calyx lobes* five, 2,6 mm long, 2 mm broad, oblong, asymmetrical in outline, conspicuous, purplish; apex elevated, obtuse; margins ciliate, broadly translucent, pinkish; abaxial surface thinly pubescent. *Petals* five, 3,8–4,2 mm long; *limb* 1,3–1,8 mm broad irregularly orbicular, pinkish, becoming recurved; *claw* 0,8–1 mm broad, strongly transversely bearded, ciliate above. *Staminodes* five, 0,1 mm long, vestigial, pale, minutely stalked, arising on the outside base of the disc. *Filaments* five, becoming 1,5 mm long, acicular, glabrous. *Anthers* five, 1 mm long, 0,7 mm broad, reddish-orange in colour with a minute spherical apical gland pointed inwards; thecae pointed at apex and base. *Pollen* 52 μ long, 30 μ broad, oblong. *Disc* exceeds the ovary by a long way, level on top, bright green, exudes nectar. *Stigma* 0,6 mm diam., globose, capitate. *Style* becoming 1,3 mm long, glabrous, erect. *Ovary* 5-carpellate, 0,7 mm long, 0,6 mm diam., apices hemispherically obtuse with a few hairs at the sides. *Fruit* (from *Williams 2238*) 5-carpellate, 6,5 mm long, 4 mm diam., green, glabrous except for a few hairs on the margins and upper adaxial surfaces; *horns* ± 1 mm long, erect, emarginate; apex bristly with very short hairs; style persisting. *Seed* 3,7 mm long including the white aril (0,7 mm long), 1,6 mm broad, black, shining.

SPECIMENS EXAMINED

CAPE—3420 (Bredasdorp): north side of pass from Wydgelegen to De Hoop, at base of limestone hills (-AD), 100 m, 3/8/1975, *Williams 2028* (NBG, K, MO, NSW, PERTH, PRE, S, STE), 9/4/1974, *Williams 1887* (NBG), 9/11/1976, *Williams 2338* (NBG); 2 miles south of Wydgelegen PO, Kalk Coastal Fynbos, occasional in valley, 400 ft, 17/12/1962, *Acocks 23169* (PRE).

DISTRIBUTION AND BIOLOGY

Up to now *Euchaetis intonsa* has only been found in one locality on the north slopes of the limestone hills running from Bredasdorp to Potberg in the vicinity of Wydgelegen. It would therefore certainly appear to be very rare. Collections of flowering material made in March, when few flowers were found, and in August when many buds were found, indicate a rather prolonged flowering period. Ripe fruits were collected in November. The presence of nectar is one indication that this plant is insect pollinated. Regeneration after fires would appear to be only from seed as the plant is single stemmed at base and the root shows no sign of previous burning off.

VARIATION

Upon encountering a species with such a limited distribution one might expect it to be a hybrid or variant. However in this case, as no probable parent plants have been found, hybridisation or variation would appear to be ruled out.

DISCUSSION

The strongly bearded petals most decidedly place this plant in the genus *Euchaetis*.

E. intonsa is a distinct species having leaves alternate, elliptic, sparsely pubescent and ciliate, with bracts, bracteoles and calyx lobes pubescent and with petals small with the midrib glabrous on the inside. It differs from *E. burchellii*, *E. laevigata* and *E. scabricosta* which have opposite leaves, glabrous bracts and glabrous calyx lobes. Although *E. meridionalis*, a more glabrous plant, is found nearby and may also have 4 or 5-ranked leaves, it differs from *E. intonsa* which has smaller, sparsely pubescent, leaves and pubescent bracts, bracteoles and calyx lobes. The epithet "intonsa" refers to this hairiness.

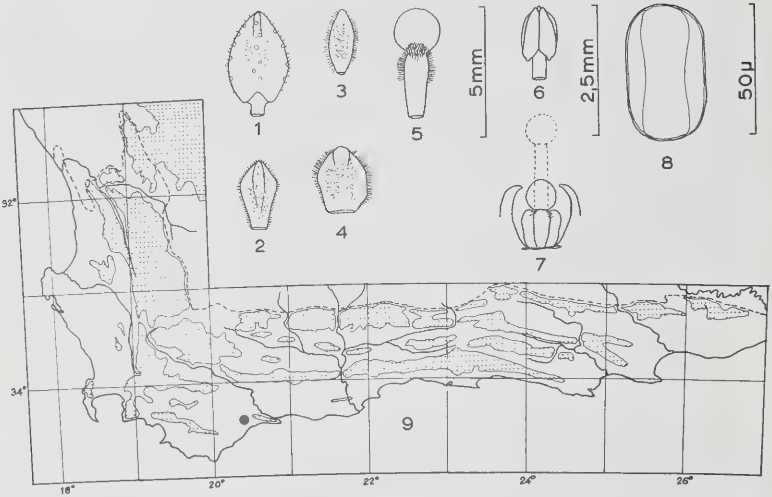

FIG. 3.
Euchaetis intonsa: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium with section of disc. 8, pollen. 9, distribution.

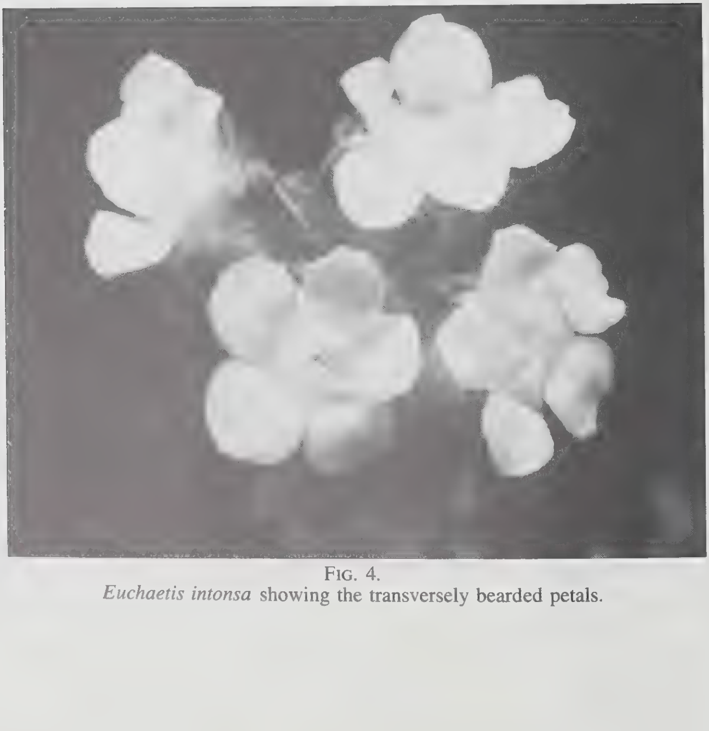

FIG. 4.
Euchaetis intonsa showing the transversely bearded petals.

Euchaetis avisylvana Williams, sp. nov. propria propter folia glabra longiciliata, sepala lanceolata acuta alba petaloidea, petala acutissima.

Frutex 1 m, ad basim monocaulis. *Rami* numerosi, recti, graciles, 2–3-chotomi, glabri. *Ramuli* erecti, graciles, recti, glabri, foliosi. *Folia* 11–14 mm longa, 1,2–1,4 mm lata, lineari-lanceolata, glabra, acuta, mucronata, longi-ciliata, erecta, sub-imbricata, alterna, glanduloso-punctata breve petiolata. *Inflorescentia* terminalis, ad 19 aggregata, alba. *Bractea* 7 mm longa, 1–2 mm lata, lineari-lanceolata, acuta, glabra, glanduloso-punctata, ad apice ciliata. *Bracteolae* duae, 4,2–4,5 mm longae, 1 mm latae, lanceolatae, acutae, glabrae, sparsim glanduloso-punctatae. *Sepala* quinque, 5 mm longa, 1,5–1,8 mm lata, lanceolata, acuta, glabra, eciliata, alba, petaloidea, persistentes. *Petala* quinque, 5 mm longa; *limbus* 2,5 mm longus, 1,1 mm latus, lanceolatus, acutissimus, glaber; *unguis* 2,5 mm longus, 1,5 mm latus, ovatus, forte transverse-barbatus, ciliatus. *Staminodia* quinque, 0,1 mm diam., vestigialia. *Fila* quinque, post anthesin 1,3 mm longa, glabra, acicularis. *Antherae* quinque, 1 mm longae, 0,7 mm latae, vinosae, apicibus minute glandulosis. *Pollen* ± 43 μ longum, ± 21 μ latum, oblongum. *Discus* 5-sinuato-crenulatus, apertus, pallido-viridus, nectarifer, ovarium excedens. *Stigma* 0,25 mm diam., pallido-viridum, capitellatum. *Stylus* initio deflexus, deinde erectus, 1 mm longus, glaber. *Ovarium* 5-carpellatum, 0,7 mm longum, 0,8 mm diam., glabrum. *Fructus* 5-carpellatus, 7 mm longus, 6 mm diam., glaber, laevis, sparsim glanduloso-punctatus, breve pedicellatus; *cornibus* 1–1,5 mm longis, erectiusculis. *Semen* 4,6 mm longum, 2,4 mm latum, piceum, nitens.

Type: CAPE—3320 (Montagu): Grootvadersbos, on a stony south facing shoulder, Heidelberg Division (-DD), 425 m (1 400 ft.) alt., 29/4/1975, *Williams 1997* (NBG, holotype; BOL, C, GRA, K, M, MO, NSW, PERTH, PRE, S, STE, isotypes).

This comparatively rare plant was first discovered by Miss Elsie Esterhuysen in September 1944 on the south slopes of the Langebergen near Strawberry Hill. This is the name of a farm adjacent to the Grootvadersbos Forest Reserve.

Shrubs 1 m tall, branching from near the base into a diffuse bush spreading about 1 m diam. *Branches* numerous, slender, fairly straight, di-trichotomous, glabrous, brown with the pale outer skin splitting off, smooth but for the small leaf scars. *Branchlets* erect, slender, straight, glabrous, pale green, well clothed with leaves. *Leaves* 11–14 mm long, 1,2–1,4 mm broad, linear-lanceolate, glabrous, erect, sub-imbricate alternate; apex acute, incurved, mucronate with a few minute hairs; margins villous-ciliate and narrowly cartilaginous; adaxial surface somewhat concave; abaxial surface with a row of gland dots on either side of the midrib; narrowed at the base to a short yellowish petiole. *Inflorescence* terminal, up to 9 florets crowded together on short branchlets or pedicels, the most advanced being nearest to the apex of the main axis. *Bract* one to each flower, 7 mm long, 1,2 mm broad, linear-lanceolate, acute, glabrous, incurved, tipped with three minute hairs, margins ciliate above, narrowly translucent below, gland[illegible]tted to either side of the midrib, sub-sessile. *Bracteoles* two, 4,2–4,5 mm long, 1 mm broad, narrowing evenly to the apex, lanceolate, acute, glabrous, tipped with one or two minute hairs, margins eciliate and narrowly translucent, sparsely gland-dotted, sessile. *Calyx lobes* five, 5 mm long, 1,5–1,8 mm broad, lanceolate, acute, glabrous, eciliate, white, erect, petaloid, persisting, with about 5 indistinct gland dots. *Petals* five, 5 mm long; *limb* about 2,5 mm long, 1,1 mm broad, glabrous, lanceolate-acute, recurved, sub-apiculate; *claw* about 2,5 mm long, 1,4 mm broad, ovate, strongly transversely bearded across the top, margins crisped ciliate, delapsing soon after anthesis. *Staminodes* five, 0,1 mm diam., a vestigial hemispherical lump on the perimeter of the disc. *Filaments* five, becoming 1,3 mm long, glabrous, acicular. *Anthers* five, 1 mm long, 0,7 mm broad, wine coloured with a small globose apical gland. *Pollen* ± 43 μ, ± 21 μ broad, oblong. *Disc* 5-sinuo-crenulate, more or less erect around the ovary exceeding it somewhat, pale green, exudes nectar. *Stigma* 0,25 mm diam., capitellate, pale green. *Style* deflexed at first, becoming 1 mm long, erect, glabrous. *Ovary* 5-carpellate, 0,7 mm long, 0,8 mm diam., glabrous with the carpels leaning inward towards the apex. *Fruit* (from *Williams 2071*) 5-carpellate, 7 mm long, 6 mm diam., glabrous, smooth, indistinctly gland-dotted, pink tinged below; *horns* very short, 1–1,5 mm long, fairly erect, purple tipped. *Seed* 4,6 mm long, 2,4 mm broad, black, shining; *aril* much reduced, black.

Specimens Examined

CAPE—3320 (Montagu): Strawberry Hill, lower south slopes of Langebergen on the steep slope above kloof (-DD), 2 000 ft., 10/9/1944, *Esterhuysen 10406* (BOL, K, NBG); Rocky slopes above stream at Naauwkrans on lower slopes of Langebergen near Heidelberg, 28/3/1948, *Esterhuysen 14444* (BOL, K, NBG); Strawberry Hill vicinity near Heidelberg, 1 800 ft., 21/7/1952, *Wurts 245* (NBG); Grootvadersbos, 6/4/1959, *Barker 8954* (NBG); Langeberg, between Lemoenshoek and Naauwkrantz, farm Strawberry Hill, 11/1/1957, *Stokoe s.n.* (NBG); Grootvadersbos, stony south facing shoulder, Heidelberg Div., 425 m (1 400 ft.), 29/4/1975, *Williams 1997* (NBG, BOL, C, GRA, K, M, MO, NSW, PERTH, PRE, S, STE); Tradouw Pass, south side near the cave, Heidelberg Div. (-DC), 1 000 ft., 10/9/1975, *Williams 2068* (NBG); Tradouw Pass, rocky shoulder about one third of way up, 1 100 ft., 10/9/1975, *Williams 2071* (NBG).

Distribution and Biology

Euchaetis avisylvana has been found only in a few places on the south slopes of the Langeberg range from Tradouw Pass eastwards for about 17 kilometres at altitudes of from 300–600 m (1 000–2 000 ft.). It grows on rocky or stony places in well drained acid soil derived from the Table Mountain Sandstone. It flowers from March until about September when ripe fruits may be collected. The reproductive parts of the flower are well protected by the bearded ciliate petals which however delapse long before the fruit has ripened leaving the pale persistent calyx lobes which look rather like petals. The flowers have a pungent smell rather like the excreta of otters, exactly similar to that of *E. longicornis*, but differing from that of *E. elata* which smells of cats' urine. These facts and the presence of nectar would indicate that the flowers are most probably pollinated by insects. Being single stemmed at base, without any stout persistent root, regeneration after fires can only take place from the seed which is ejected by the usual catapult mechanism when ripe. This is a factor which could make this plant susceptible to elimination by too frequent burning of the habitat. As it is, it appears to be in a precarious position as relic populations in the Tradouw Pass are at present being eliminated by road building and the population at Grootvadersbos is standing beneath the trees in a pine plantation belonging to the Department of Forestry.

DISCUSSION

The strongly bearded petals and the vestigial staminodes are the main characters which place this plant in the genus *Euchaetis*.

Euchaetis avisylvana is distinct on account of having villous-ciliate leaves tipped with a few hairs at the apex; lanceolate-acute, white, somewhat petal-like

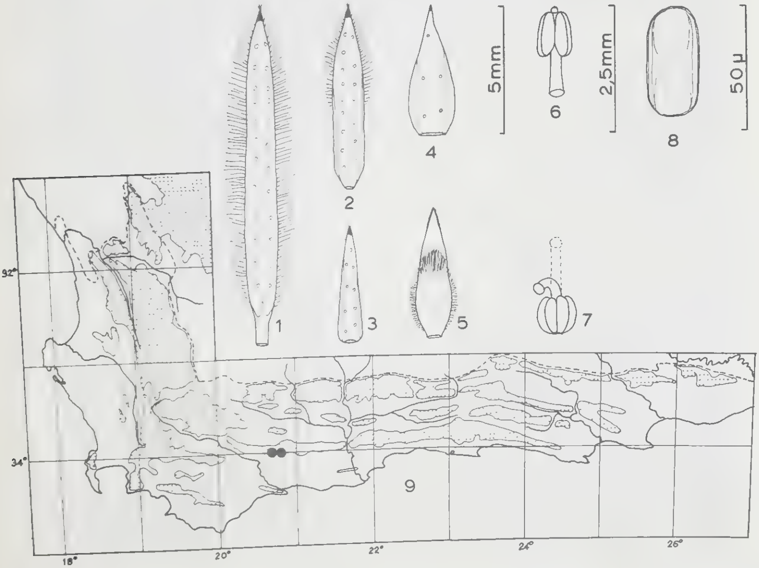

FIG. 5.
Euchaetis avisylvana: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

calyx lobes and acute petals. It differs from *E. elata* E. & Z. which has leaves, bracts, bracteoles and calyx lobes much shorter and ciliolate not villous-ciliate, and also the blade of the petal elliptic-apiculate not lanceolate-acute. The very short horns of *E. avisylvana* at once distinguish it from *E. longicornis* Williams which has very sharp pointed leaves; bracts, bracteoles and calyx lobes with scattered gland dots. The name is a latinisation of *grootvadersbos*, the locality where the type material was gathered.

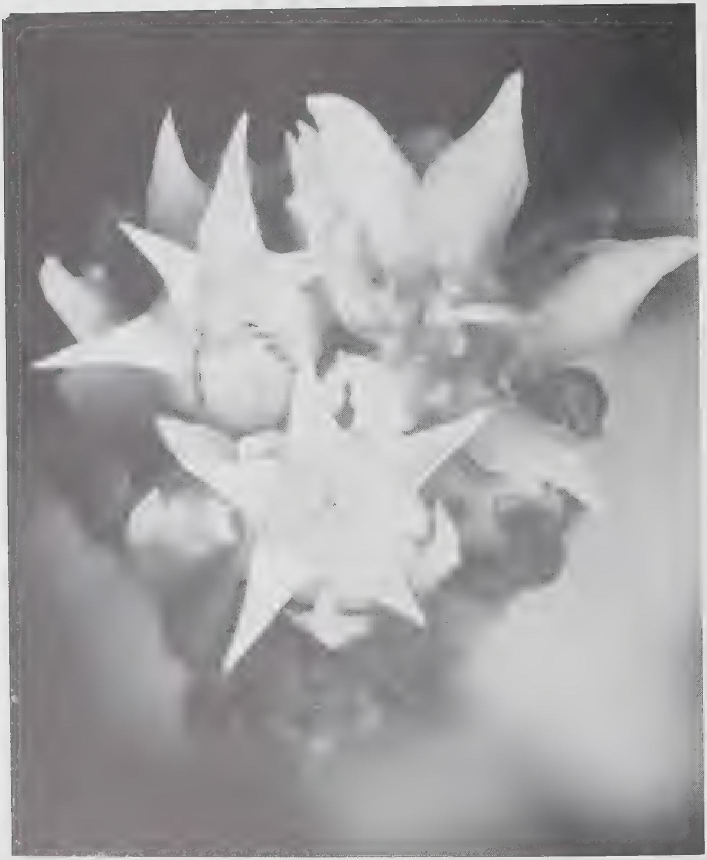

FIG. 6.
Euchaetis avisylvana showing the transversely bearded petals and, with petals removed, the disc with vestigial staminodes.

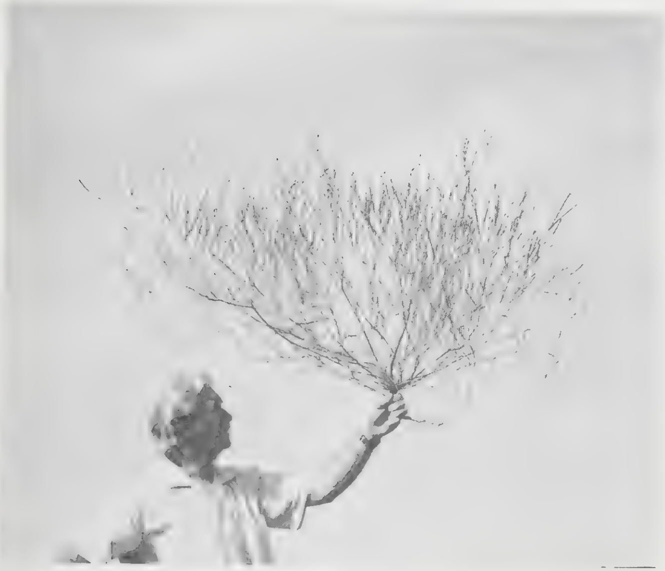

FIG. 7.
Euchaetis avisylvana habit.

Acmadenia patentifolia Williams, sp. nov. propria propter folia parva crassa patentia alterna, flores parvos petalis patentibus, fructum magnum cornibus longis.

Frutex 1 m, 2 m diam., densus, ad basim monocaulis. *Rami* numerosi, erecti, breves, glabri, dichotomi. *Ramuli* numerosi, erecti, brevissimi, sub-flexuosi, glanduloso-punctati. *Folia* 1,8–2,7 mm longa, 1,3–1,6 mm lata, oblongo-lanceolata, obtusa, sessilia, crassa, patentia, alterna, prope basin sparsim puberulis, 2–3 glanduloso-punctata. *Inflorescentia* terminalis, sessilis, 1–2 nata. *Bractea* 1,5 mm longa, 1–1,2 mm lata, foliis similis. *Bracteolae* duae, 1,4 mm longae, 1 mm latae, late-lanceolatae, obtusae, marginibus ad basin translucentibus sparsim ciliolatis puberulisque, intus minute puberulae. *Sepala* quinque, 1,5 mm longa, 1–1,2 mm lata, oblonga, obtusa, ad apicem crassa, marginibus ad basin anguste hyalinis sparsim ciliolatis puberulisque, intus minute puberula. *Petala* quinque, 2,6–2,8 mm longa; *limbus* 2 mm longus, 1,3 mm latus, lanceolatus, obtusiusculus, glaber, 1–3 glanduloso-punctatus. *Staminodia* quinque, 0,8 mm longa, ad apices glandulosa. *Filamenta* quinque, post anthesin 1,5 mm longa, acicularia, glabra, erecta. *Antherae* quinque, ante anthesin 1 mm longae, 0,6 mm latae, apicibus sessili-glandulosis. *Pollen* 43 μ longum, 23 μ latum, ellipticum. *Discus* viridus, crassus, nectarifer, obvallatus. *Stigma* 0,3 mm diam., capitellatum. *Stylus* 1 mm longus, erectus, glaber, persistens. *Ovarium* 5-carpellatum, 0,8 mm lon[illegible]m, 0,8

mm diam., glabrum, apicibus globosis. *Fructus* 5-carpellatus, 16 mm longus, 7 mm diam., glaber, viridus, multi-glanduloso-punctatus, cornibus 4 mm longis. *Semen* 5–5,6 mm longum arilo exclusa, 2–2,3 mm latum, piceum, nitens; *arillus* 1–1,5 mm longus, albus.

Type: CAPE—3219 (Wuppertal): on track from Krom River to Breekkrantz, South Cedarberg, Clanwilliam Division (-CB), 914 m (3 000 ft.), 18/9/1975, *Williams 2087* (NBG, holotype; K, MO, M, PRE, S, STE, isotypes).

Acmadenia patentifolia was discovered by Miss Elsie Esterhuysen of the Bolus Herbarium in 1952 at Krom River in the South Cedarberg. She encountered this plant again in 1961 on the Swart Ruggens in the Ceres Division. No further collections were made until 1975 when the material upon which this description was based was gathered near Krom River in the Clanwilliam Division.

Shrubs 1 m tall, spreading to 2 m diam., forming a dense rounded bush with many branches arising from a single stem at base. *Branches* numerous, erect, short, glabrous, irregularly bent, dichotomous; *bark* rough, ashy brown. *Branchlets* numerous, erect, very short, sub-sinuous, sparsely and minutely puberulous, reddish, lumpy with oil glands at open spaces, often encrusted with small pieces of a red resinous exudate at the base of the leaves. *Leaves* 1,8–2,7 mm long, 1,3–1,6 mm broad, oblong-lanceolate, obtuse, thick, sessile, spreading, alternate; apex with an immersed callus; margins rounded with the cartilage immersed; midrib rounded with 1–3 gland dots; the base thinly puberulous clasping the stem. *Inflorescence* terminal, sessile, solitary or paired; *flower* 6 mm diam., with the white petals spreading to reveal the green calyx lobes and the green disc; *calyx* minutely puberulous. *Bract* 1,5 mm long, 1–1,2 mm broad, leaf-like, somewhat ciliolate at base. *Bracteoles* two, 1,4 mm long, 1 mm broad, broadly lanceolate, obtuse, 1–3 gland-dotted; margins below broadly translucent, minutely and sparsely ciliolate, thinly puberulous; adaxial surface minutely puberulous. *Calyx lobes* five, 1,5 mm long, 1–1,2 mm broad, oblong, obtuse, thick at the apex, sparsely gland-dotted, sparsely and minutely puberulous inside and at the sides below. *Petals* five, 2,6–2,8 mm long; *limb* 2 mm long, 1,3 mm broad, lanceolate, sub-obtuse, glabrous, 1–3 gland-dotted, white, spreading-recurved, margins minutely denticulate; *claw* 0,8 mm long, smooth. *Staminodes* five, 0,8 mm long, 0,25 mm broad at base, transversely flattened below, arising near the base of the petal, apical gland 0,15 mm diam., globose, pale yellow. *Filaments* five, becoming 1,5 mm long, acicular, glabrous, erect. *Anthers* five, before anthesis 1 mm long, 0,6 mm broad, apical gland small semi-immersed. *Pollen* 43 μ long, 23 μ broad, elliptic. *Disc* erect, green, thick, exudes nectar, slightly exceeds the ovary. *Stigma* almost 0,3 mm diam., capitellate. *Style* becoming 1 mm long, erect, glabrous, persisting. *Ovary* 5-carpellate, 0,8 mm long, 0,8 mm diam., glabrous, apices globose. *Fruit* 5-carpellate, 16 mm long, 7 mm diam., glabrous, green, multi-gland-dotted; *horns* 4 mm long, spreading at ±45 °, tinged with purple, apex with a small immersed gland. *Seed* 5–5,6 mm long excluding the aril, 2–2,3 mm broad, black, shining; *aril* 1–1,5 mm long, white.

SPECIMENS EXAMINED

CAPE—3219 (Wuppertal): rocky ridge, Krom River, South Cedarberg, Clanwilliam Division (-CB), 3 000–4 000 ft., 4/10/1952, *Esterhuysen 20542* (BOL); on track from Krom River to Breekkrantz, South Cedarberg, Clanwilliam Division, 914 m (3 000 ft.), 18/9/1975, *Williams 2087* (NBG, K, MO, M, PRE, S, STE); on rocky plateau, Stompiesfontein, Swartruggens, Ceres Division (-DC), 4 000 ft., 19/11/1961, *Esterhuysen 29351* (BOL).

DISTRIBUTION, BIOLOGY AND VARIATION

Acmadenia patentifolia, with its insignificant flowers, has very seldom been gathered. Although dominant in the small areas where it has been found it appears to be a very rare plant. Being in some respects (i.e. the fruit), remarkably like a *Diosma* it would be a pity if this possible link with the *Acmadenia* were to be lost. It has been found growing on a stony quartzitic ground derived from Cape Geological System in, as far as is known, only two localities, about 40 km apart, both falling within the winter rainfall area of the South Western Cape. No variation has been noted.

The little white flowers, with spreading petals exposing the nectariferous disc, are most probably pollinated by insects. The seeds when ripe are ejected by the usual catapult mechanism and regeneration appears to be only from seed. A section, 13 mm diam., from the stem near the base of one rather small plant showed 28 annual rings indicating that fires seldom occur. The leaves have a faint smell of eucalyptus (blue gum) when crushed.

DISCUSSION

Although the wide open flower and the large fruit with long horns give *A. patentifolia* the appearance of a *Diosma*, the presence of staminodes attached at the outer base of the disc adjacent to the petals, the shape of the disc itself, closely surrounding the ovary not open and crenulate, and the rather close resemblance of the whole plant to *Acmadenia tetracarpellata* lead one to place it in the genus *Acmadenia*. Other species in *Acmadenia* with similar open flowers and small staminodes are *A. matroosbergensis* and *A. teretifolia*. Factors excluding this plant from other genera of the *Diosmeae* are: (1) *petals* without any transverse beard; (2) *staminodes* present; (3) *anther* with a small apical gland; (4) *stigma* capitellate; (5) *style* short; (6) *filament* and *style* glabrous.

It is interesting to note the way in which the base of the leaf is closely adpressed to the branch around its point of attachment, reminding one of a parasitic scale insect. *Acmadenia patentifolia* is recognised as distinct on account of having very small, thick, alternate leaves, small open flowers and a large fruit with long horns. It looks rather like *A. tetracarpellata* which however has somewhat thinner, opposite leaves and a four-carpellate fruit.

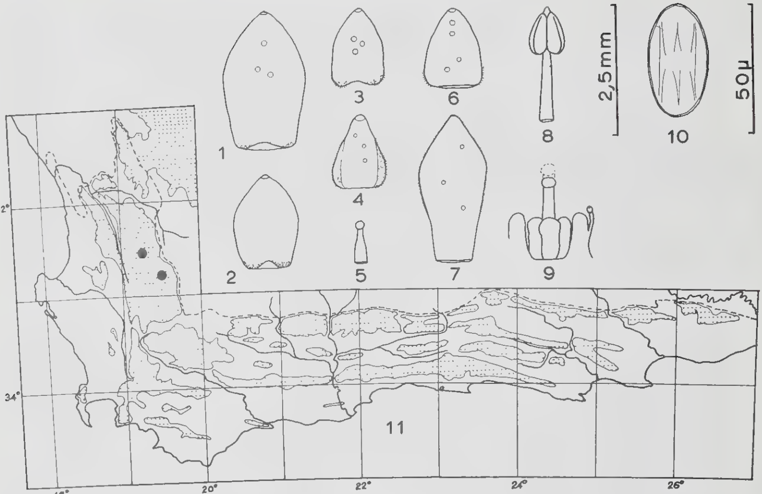

FIG. 8.
Acmadenia patentifolia: 1, leaf. 2, leaf. 3, bract. 4, bracteole. 5, staminode. 6, calyx lobe. 7, petal. 8, anther. 9, gynoecium with section of disc. 10, pollen. 11, distribution.

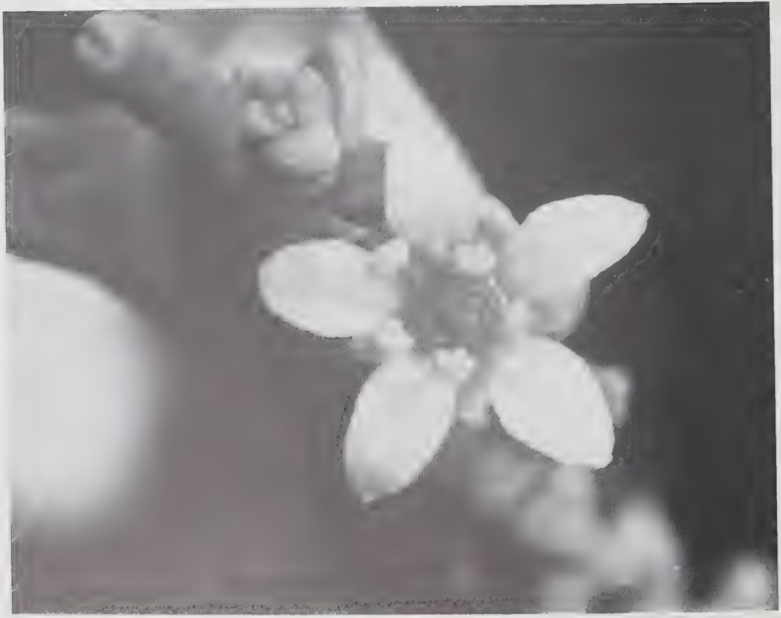

FIG. 9.
Acmadenia patentifolia showing disc, staminodes etc.

Acmadenia kiwanensis Williams, sp. nov. propria propter folia alterna lanceolata acuta puberula apicibus minute echinulatis, bracteolas nullimodo apiculatas, fructum aliquantum pubescentem sepala magnopere excedentem.

Frutex 300–500 mm, ad basin monocaulis. *Rami* patentes, subnumerosi, glabri. *Ramuli* aliquanto numerosi, erecti, albopuberuli. *Folia* 7–14 mm longa, 2,2–1,5 mm lata, lanceolata vel lineari-lanceolata, acuta, petiolata, glanduloso-punctata, puberula, alterna, patentes, apicibus minute echinulatis, marginibus initio ciliolatis. *Inflorescentia* solitaria, terminalis, 10 mm diam., roseus. *Bractea* 4 mm longa, 1,5 mm lata, oblonga, acuta, glabra, ad basin translucens. *Bracteolae* duae, 3,5 mm longae, 2 mm latae, lanceolatae, acutae, ciliatae, glabrae, ad basin translucentes. *Sepala* quinque, 3 mm longa, 2 mm lata, ovato-lanceolata, acuta, glabra, villoso-ciliata, intus in medio pubescentia. *Petala* quinque, in toto 6 mm longa; *limbus* 2,5 mm lata, obovatus, apiculatus, glaber, roseus, recurvus; *unguis* 3 mm longus, 1,2 mm latus, pubescens. *Staminodia* quinque, 1 mm longa, erecta, glabra, ad apice glandulosa. *Filamenta* quinque, post anthesin 2,5 mm longa, acicularia. *Antherae* quinque, 1,5 mm longae, 0,8 mm latae, flavovirentia, apicibus glandulosis. *Pollen* 40 μ longum, 33 μ latum. *Discus* erectus, breviter ovarium excedens, viridus. *Stigma* 0,7 mm diam., viridum, capitatum. *Stylus* 2 mm longus, erectus, glaber. *Ovarium* 5-carpellatum, 0,8 mm diam., sparsim pubescens. *Fructus* 5-carpellatus, 6,5 mm longus, 4,5 mm diam., aliquantus pubescens, sepala magnopere excedens, cornibus c. 1,5 mm longis. *Semen* 4,5 mm longum, 1,9 mm latum, piceum, nitens.

Type: CAPE—3327 (Peddie): on right hand side of road to Kiwane, 2,6 km from main Peddie/East London road (-BA), 122 m (400 ft.) alt., 9/3/1976, *Williams 2175* (NBG, holotype; BOL, GRA, K, MO, NSW, PRE, S, isotypes).

Acmadenia kiwanensis was apparently collected for the first time by an Agricultural Officer in the Native Affairs Department in 1952 who noted that it was "prevalent between Keiskamma and Chalumna Rivers within five miles of the coast". Comins found it again in 1956 on "south west facing slopes above Kiwani River". Samples of their material, preserved at both Pretoria and Grahamstown, looked rather different from any other known *Acmadenia* and the locality was so much further to the east than that of any other member of the genus, that it became imperative for this plant to be further investigated by the collection of fresh material. The collection of fresh material on a field trip of some 2 260 km resulted in the publication of this description.

Shrubs 300–500 mm tall, single stemmed at base. *Branches* fairly numerous, almost sprawling (perhaps due to trampling by cattle), greyish-brown, glabrous. *Branchlets* fairly numerous, erect, somewhat clustered, not hidden by the leaves, at first densely clothed with short white erect hairs. *Leaves* 7–14 mm long including the petiole 1–1,5 mm long, 2,2–1,5 mm broad, the longest being narrower, lanceolate to linear-lanceolate, acute, 5-ranked, alternate, [illegible]reading,

uppermost erect at first; apex pale minutely bristly; margins scabrid, at first ciliolate becoming virtually eciliate; abaxial surface with gland dots small and numerous scattered between midrib and margins, pubescent with short erect hairs mainly towards the margins and midrib. *Inflorescence* solitary, terminal, 10 mm diam., pink, subtended by several bract-like leaves. *Bract* 4 mm long, 1,5 mm broad, oblong, acute, glabrous or puberulous, petiolate. *Bracteoles* two, 3,5 mm long, 2 mm broad, lanceolate, acute, puberulous above, ciliate, broadly translucent below. *Calyx lobes* five, 3,5 mm long, 2 mm broad, ovate-lanceolate, puberulous above; apex acute green, elevated; margins ciliate, broadly translucent and villous ciliate below; adaxial surface pubescent in the middle. *Petals* five, 6 mm long overall; *limb* 2,5 mm broad, obovate, apiculate, glabrous, pink, spreading; *claw* 3 mm long, 1,2 mm broad, narrowing to the base, pubescent and bulged inwards at the throat. *Staminodes* five, 1 mm long, erect, glabrous, gland-tipped. *Filaments* five, becoming 2,5 mm long erect, glabrous, acicular. *Anthers* five, 1,5 mm long, 0,8 mm broad, greenish-yellow, apical gland pointed and minute. *Pollen* 40 μ long, 33 μ broad, broadly elliptic. *Disc* fleshy, green, erect, just exceeding the ovary. *Stigma* 0,7 mm diam., green, capitate. *Style* becoming 2 mm long, glabrous, ever-erect. *Ovary* 5-carpellate, 0,8 mm diam., somewhat pubescent at the sides of the carpels. *Fruit* 5-carpellate, 6,5 mm long, 4,5 mm diam.; *carpels* green, minutely gland-dotted, short-pubescent mainly at the sides; *horns* 1,5 mm long, erect, apex cleft adaxially. *Seed* 4,5 mm long, 1,9 mm diam., black, shining, endosperm black-covered.

SPECIMENS EXAMINED

CAPE—3327 (Peddie): prevalent between Keiskamma and Chalumna rivers, within 5 miles of coast (-BA), -/8/1952, *C.A.O. Native Affairs Dept. A1906* (GRA, PRE); S.W. facing slope above Kiwane river 18/5/1956, *Comins 1522* (GRA, PRE); on right hand side of road to Kiwane, 2,6 km from the main Peddie/East London road 122 m (400 ft.), 9/3/1976, *Williams 2175* (NBG, BOL, GRA, K, MO, NSW, PRE, S).

DISTRIBUTION AND BIOLOGY

Acmadenia kiwanensis, so far as is known, occurs only between the Keiskamma and Chalumna rivers within 8 km of the coast. It grows in relic fynbos surrounded by mixed grassveld in shallow soil on flat quartzitic sandstone. The surrounding area is fairly heavily grazed by cattle and frequently burnt off. The plants appear to have been trodden down at some time but have lately escaped burning. It is doubtful if they could survive veld fires as there is no evidence of a persistent rootstock such as is possessed by *Agathosma peglerae*, a plant which occurs nearby in the recently burnt grassveld. One or two ripe fruits having been seen early in March, indicate that flowering had been taking place some months earlier and material collected some time in August was also still flowering. From this it would appear that flowering must extend over a considerable part of the year. The pink flowers and nectariferous disc indicate that this plant is most probably pollinated by insects. Regeneration is from seed which is ejected when ripe in the usual way by a catapult mechanism. The leaves, when crushed, have a pleasant sweet smell faintly approaching that of aniseed.

DISCUSSION

This plant is placed in the genus *Acmadenia* because of having clawed petals, pubescent and bulging inwards at the throat, staminodes 1 mm long and an obvallate disc, i.e. that exceeds and surrounds the ovary but does not spread outwards or close over it.

Characters that exclude other genera of the *Diosmeae* are: (1) *style* and *filaments* glabrous and short; (2) *anthers* with a small apical gland; (3) *fruit* 5-carpellate.

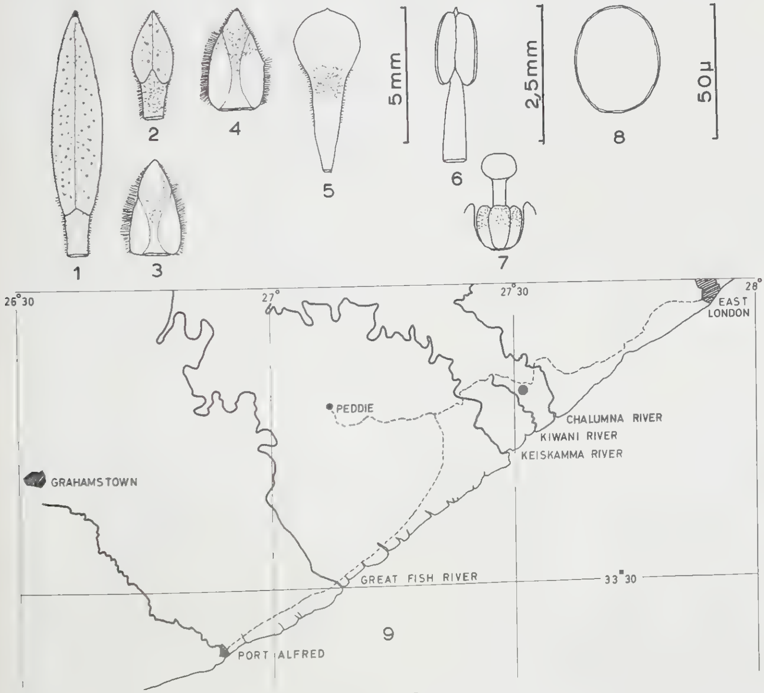

FIG. 10.
Acmadenia kiwanensis: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium with section of disc. 8, pollen. 9, distribution.

Acmadenia kiwanensis is recognised as distinct on account of its having alternate, lanceolate-acute, puberulous leaves with the tips pale and minutely bristly, fruits somewhat pubescent with fairly short horns and imbricated only towards the base by the calyx lobes. Geographically the nearest species in the same genus is *A. obtusata* (Thunb.) B. & W., about 200 km to the south west, near to Port Elizabeth, growing on limestone, with leaves nearly always opposite, with bracts and bracteoles apiculate and with fruits glabrous, short horned and more or less hidden by the calyx lobes. Further to the west beginning near Plettenberg Bay *A. alternifolia* can be readily distinguished by its fruits with much longer horns.

Acmadenia nivea Williams, sp. nov. propria propter folia lanceolata glabra, petala nivea, staminodia 0,09–0,5 mm variantia, antheras minute ± sessili-glanduliferas, ovarium 3 vel 4-carpellatum, cornibus binatim perbrevibus.

Frutex 200–300 mm, graciles, diffusus, ad basin monocaulis. *Rami* pauci, laxiusculi, glabrescenti, porphyrei, sparsim 2-chotomi. *Ramuli* pauci, graciles, erecti, sparsim puberuli, porphyrei. *Folia* 6–8 mm longa, 1,5–1,8 mm lata, lanceolata, acuta, rubro-mucronata, brevi petiolata, glabra, bifaria glanduloso-punctata, adpressa vel sub-patentia, alterna vel interdum ad basin opposita, marginibus late translucentibus ciliatis vel eciliatis. *Inflorescentia* terminalis, ad 7-aggregata; *flos* 6 mm diam., sessilis, niveus, fauce contractus. *Bractea* 2,7–5 mm longa, 0,7–1,3 mm lata, extima folio simili, intima lanceolata, rubro-mucronata, glabra, glanduloso-punctata, sessilia, marginibus ad basin late translucentibus ciliolatis. *Bracteolae* duae, 2,3 mm longae, 0,6 mm latae, lanceolatae, rubro-mucronatae, ciliolatae, marginibus ad basin translucentibus. *Sepala* quinque, 2,8–3 mm longa, 1,5 mm lata, elliptica, glabra, ciliata, rubro-mucronata, marginibus late translucentibus. *Petala* quinque, 5 mm longa; *limbus* 1,8 mm latus, ellipticus, glaber, nivea, patens; *unguis* glaber, translucens, ciliolatus vel eciliolatus. *Staminodia* quinque, 0,09–0,5 mm longa variantia, vestigialia. *Filamenta* quinque, post anthesin 1 mm longa, glabra, acicularia, erecta. *Antherae* quinque, ante anthesin 0,9 mm longae, 0,6 mm latae, vinosae, minute glanduliferae. *Stigma* 0,3 mm diam., viridum, capitatum. *Stylus* 0,5 mm longus, glaber, erectus. *Ovarium* 3 vel 4-carpellatum, 0,5 mm diam., globosum, glabrum; *carpellum* ad apicem bifidum. *Fructus* 3 vel 4-carpellatus, breve pedicellatus, 3,5 mm longus, glaber; *cornibus* binatim, perbrevibus. *Semen* 2,3 mm longum, 1,5 mm latum, ovoideum, piceum, nitens.

Type: CAPE—3418 (Simonstown): marshy ground, peaty soil, amongst restiads, Steenbras catchment area, Kogelberg, Caledon Division (-BB), 1 265 m (4 150 ft.), 13/6/1975, *Williams 2006* (NBG, holotype).

Acmadenia nivea was first discovered by T. Stokoe in August 1924 on the Kogelberg. He also found it on the top of Somerset Sneeuwkop in 1937. Being a rare plant it has been very seldom seen and very little material has been distributed.

Shrubs 200–300 mm tall, slender, diffuse, branching from a single stem at base. *Branches* few, somewhat lax, glabrescent, reddish-brown, sparingly dichotomous. *Branchlets* few, slender, erect, sparsely puberulous, reddish-brown. *Leaves* 6–8 mm long, 1,5–1,8 mm broad, lanceolate, acute, rubro-mucronate, short-petiolate, glabrous, with 2 rows of gland dots, adpressed or sub-spreading, alternate or at the base sometimes opposite; margins broadly translucent, thin, ciliate or eciliate. *Inflorescence* terminal, up to 7-aggregate; *flower* 6 mm diam., sessile, pure white, contracted at the throat. *Bract* 2,7–5 mm long, 0,7–1,3 mm broad, the outermost leaf-like, the inner becomingly lanceolate, rubro-mucronate, glabrous, gland-dotted, sessile; margins towards the base broadly translucent, ciliolate. *Bracteoles* two, 2,3 mm long, 0,6 mm broad, lanceolate, rubromucronate, ciliolate; margins translucent below. *Sepals* five, 2,8–3 mm long, 1,5 mm broad, elliptic, glabrous, ciliate, rubro-mucronate; margins broadly translucent. *Petals* five, 5 mm long bent inwards at the throat; *limb* 1,8 mm broad, elliptic, glabrous, pure white, spreading; *claw* glabrous, translucent, ciliate above or eciliate. *Staminodes* five, varying from 0,09 mm to 0,5 mm vestigial, arising on the outside of the disc. *Filaments* five, becoming 1 mm long, glabrous, acicular, erect. *Anthers* five, 0,9 mm long, 0,6 mm broad before anthesis, wine coloured with a minute apical gland. *Stigma* 0,3 mm diam., depressed globose, green, capitate. *Style* becoming 0,5 mm long, glabrous, erect. *Ovary* 3-carpellate or (as in *Esterhuysen 15245)* 4-carpellate, 0,5 mm diam., globose, glabrous; *carpel* bifid at the apex. *Fruit* 3–4 carpellate, short-pedicellate, 3,5 mm long, glabrous; *horns* paired, extremely short. *Seed* 2,3 mm long, 1,5 mm broad, egg-shaped, black, shining.

SPECIMENS EXAMINED

CAPE—3418 (Simonstown): Kogelberg, near the summit, marshy areas, Caledon Division (-BB), 4 100 ft., –/8/1924, *Stokoe 968* (BOL), –/11/1944, *Stokoe s.n.* (BM, BOL, NBG, PRE, SAM *58809*), 15/11/1964, *Esterhuysen 30644* (BOL), 7/5/1966, *Esterhuysen s.n.* (BOL), 15/4/1966, *Thompson 181* (PRE, STE), 21/4/1970, *Boucher 1244* (STE), 13/6/1975, *Williams 2006* (NBG); marshy areas between Kogelberg and Spinnekopnes, 31/9/1975, *Vogelpoel s.n. (Williams 2090)* (NBG); Somerset West Sneeuwkop, Caledon Division, 5 000 ft., 12/3/1937, *Stokoe 5016* (BOL, SAM *52244*), 10/2/1957, *Esterhuysen 20764* (BOL); on rock or on steep rocky slopes on south side of Somerset West Triplets, Caledon Division, 4 800 ft., 10/4/1949, *Esterhuysen 15245* (BOL); Kogelberg Forest Reserve, north east slopes of Voorberg, Caledon Division (-BD), 550 m, 2/10/1971, *Boucher 1648* (STE).

DISTRIBUTION, BIOLOGY AND VARIATION

Acmadenia nivea is found only on the high peaks of the Hottentots Holland mountains 1 250 to 1 600 m (4 100–5 200 ft.) above sea level growing in marshy areas usually facing south to south east. It is an extremely rare plant, a few individuals only being found scattered amongst the vegetation. It is destroyed by fires and regeneration can only take place from seed. The brilliantly white petals must be attractive to insects and perhaps moths. The disc is fairly flat on top, dark green, fleshy and exudes nectar. It forms an annulus around and slightly above the unextended stigma while the pollen is being shed. The anthers remain below the contracted throat of the perianth. After the pollen is shed the style lengthens placing the receptive stigma on a level with the empty anthers. It would appear therefore that this plant is insect pollinated and that the reproductive parts of the flowers are well protected against the inclement weather usually experienced at these exposed altitudes.

There seems to be some evidence of variation in this species perhaps indicating a trend towards reduction. Populations from the Somerset Sneeuwkop area have flowers with staminodes 0,4–0,3 mm long and ovaries with 4 to 3 carpels. Populations from the Kogelberg area have flowers with staminodes reduced to between 0,3 and 0,1 mm long and ovaries with 3 carpels. In the very closely related species, *A. candida*, the staminodes are reduced to a minute scale 0,05 mm in diameter and the ovary to only two carpels.

DISCUSSION

Although having an ovary with only 3–4 carpels instead of the more normal number of 5, this plant is placed in the genus *Acmadenia* because of having (1) *petals* clawed and bent inwards at the throat without any transverse beard; (2) *staminodes* present; (3) *anthers* with a small apical gland; (4) *disc* closing over the ovary; (5) *stigma* capitellate; (6) *style* short, erect, glabrous; (7) *filaments* short, glabrous.

Acmadenia nivea is recognised as distinct on account of having glabrous, lanceolate leaves, snow white petals, staminodes varying from 0,09 to 0,5 mm long, anthers with minute ± sessile apical glands and a 3–4 carpellate ovary. It is nearest to *Acmadenia candida*, a smaller plant, in which however the ovary is reduced to only two carpels. The name refers to the pure white petals.

Acmadenia candida Williams, sp. nov. propria propter fruticem gracillimum glaberrimumque, petala candida, staminodia mimima, antheras glanduliferas minute stipitatas, ovarium 2-carpellatum.

Frutex 250–300 mm, gracillimus, ad basin monocaulis. *Rami* pauci, gracillimi, laevi, erecti, aphylli, porphyrei, 1–2 chotomi. *Ramuli* pauci, filiformi, brevi, sparsim foliosi. *Folia* 4–5 mm longa, 1 mm lata, lanceolata, glabra, sessilia, erecta, alterna, minute scabrido-mucronulata, bifaria glanduloso-punctata, sparsim

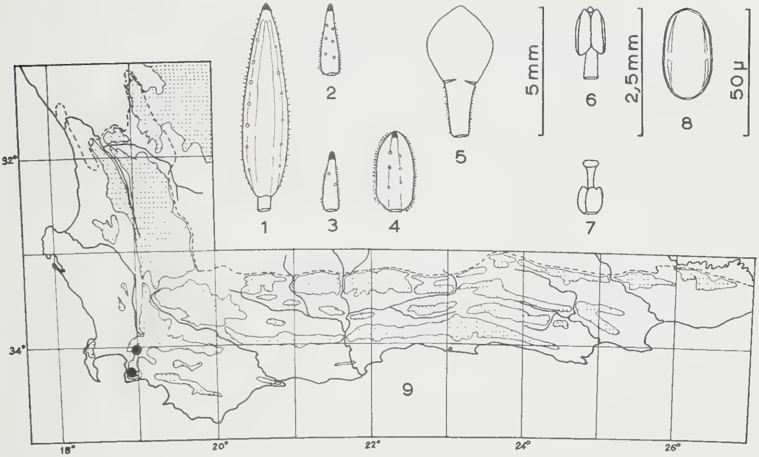

FIG. 11.
Acmadenia nivea: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7. gynoecium. 8, pollen. 9, distribution.

ciliolata vel eciliata, marginibus late translucentibus. *Inflorescentia* terminalis, ± 6-aggregata; *flos* 4 mm diam., candidus, fauce contractus. *Bractea* 1,7–2,3 mm longa, 0,6–0,8 mm lata, lanceolata, acuta, mucronulata, glanduloso-punctata, glabra, sparsim ciliolata, marginibus translucentibus. *Bracteolae* duae, 1,1 mm longae, 0,4 mm latae, lanceolatae, mucronulatae, glabrae, sparsim ciliolatae, marginibus translucentibus. *Sepala* quinque, 1,8 mm longa, 0,9 mm lata, ovato-lanceolata, mucronulata, glabra, sparsim glanduloso-punctata, ciliolata, marginibus late translucentibus. *Petala* quinque, 3,1 mm longa; *limbus* 2 mm diam., orbicularis, glaber, candidus, patens; *unguis* 1,1 mm longus, 0,7 mm latus, crispo-ciliatus. *Staminodia* quinque, 0,05 mm diam., ultima vestigialia. *Filamenta* quinque, post anthesin 0,6 mm longa, glabra, erecta. *Antherae* quinque, ante anthesin 0,5 mm longae, 0,3 mm latae, vinosae, glanduliferae minute stipitatae. *Pollen* 28 μ longum, 17 μ latum, oblongum. *Stigma* 0,15 mm diam., capitellatum, globosum. *Stylus* 0,6 mm longus, glaber, erectus. *Ovarium* 2-carpellatum, ± 0,3 mm diam., glabrum; *carpellum* ad apicem bifidum. *Fructus* et *semen* a nobis non visa.

Type: CAPE—3419 (Caledon): in a marsh on level area, top of road from Nuweberg Forest Station, mixed up with low dense Restionaceae, east slopes of Landdrost Kop, Caledon Division (-AA), 1 070–1 220 m (3 500–4 000 ft), 17/3/1968, *Esterhuysen 31946* (BOL, holotype).

Acmadenia candida was discovered by T. Stokoe in 1943 growing on the east slopes of Landdrost Kop in the Hottentots Holland Mountains. It was not until 1968, after the Forestry Department had constructed a road up to the east slopes of Landdrost Kop, that Miss Elsie Esterhuysen again found this plant. Two months later she made another collection and subsequently the Forestry Department burnt the whole area off as a firebreak. Repeated searches in recent years have failed to reveal anything and now the Forestry Department, having declared this a ''Wilderness Area'', have constructed an enormous mountain chalet at the end of their access road. It is quite possible that this species is now extinct.

Shrubs 250–300 mm tall, slender, single-stemmed below. *Branches* few, extremely slender, smooth, erect, leafless, reddish-brown, 1–2 chotomous. *Branchlets* few, filiform, short, rather sparsely leafy, exoderm like snake skin splitting off, arising from immediately below the inflorescence. *Leaves* 4–5 mm long, 1 mm broad, lanceolate, scabrido-mucronulate, glabrous, 2-fariously gland-dotted, very sparsely ciliolate or eciliate, adpressed erect, alternate margins broadly translucent. *Inflorescence* terminal, up to 6-aggregate with flowers about 4 mm diam., pure white, contracted at the throat. *Bract* 1,7–2,3 mm long, 0,6–0,8 mm broad, lanceolate, acute, mucronulate, gland-dotted, glabrous, sparsely ciliolate, margins translucent. *Bracteoles* two, 1,1 mm long, 0,4 mm broad, lanceolate, mucronulate, glabrous, sparsely ciliolate, margins translucent. *Calyx lobes* five, 1,8 mm long, 0,9 mm broad, ovate-lanceolate, mucronulate, glabrous, gland-dotted, ciliolate, margins broadly translucent. *Petals* five, 3,1 mm long, clawed, bent inwards at the throat; *limb* 2 mm diam., orbicular, glabrous, spreading, pure white; *claw* 1,1 mm long, 0,7 mm broad, margins above shaggy ciliate. *Staminodes* five, 0,05 mm diam., an absolutely minute vestigial scale on the outside of the disc. *Filaments* five, becoming 0,6 mm long after anthesis, glabrous, erect. *Anthers* five, 0,5 mm long, 0,3 mm broad before anthesis, reddened with a minutely stipitate apical gland. *Pollen* 28 μ long, 17 μ broad, oblong with a rather thick skin. *Disc* closes over the ovary to some extent. *Stigma* 0,15 mm diam., globose, capitellate. *Style* becoming 0,6 mm long, glabrous, erect. *Ovary* 2-carpellate, ± 0,3 mm diam.; *carpels* glabrous, bifid at the apex. *Fruit* and *Seed* not seen.

SPECIMENS EXAMINED

CAPE—3419 (Caledon): east of Landdrost Kop (-AA), -/4/1934, *Stokoe 2845* (BOL); in a marsh on level area, top of road from Nuweberg Forest Station, east slopes of Landdrost Kop 3 500–4 000ft, 17/3/1968, *Esterhuysen 31964* (BOL, holotype); in a marsh at east base of Landdrost Kop, Nuweberg Forest Reserve 3 000–3 500 ft, 18/5/1968, *Esterhuysen 31961* (BOL).

DISTRIBUTION, BIOLOGY AND VARIATION

Acmadenia candida is apparently a very rare plant. As far as is known it occurred in only one locality on the eastern slopes of the Hottentots Holland mountains at an elevation of about 1 070 m (3 500 ft) above sea level growing amongst low Restionaceae in a marsh. Flowering appears to extend from mid March to the middle of May. Fruiting material has not been seen. The conspicuous pure white flower with a constricted throat, may indicate that it is insect pollinated, perhaps by some small moth.

With so little material it is impossible to observe any variation but in this species we see an example of reduction carried to limits that may lead to extinction.

DISCUSSION

The characters that indicate that this plant should be placed in the genus *Acmadenia* and which exclude it from other genera of the *Diosmeae* are: (1) *petals* clawed, bent inwards at the throat without any transverse beard; (2) *staminodes* present on the outer surface of the disc although only vestigial; (3) *anthers* with a small apical gland; (4) *disc* closing over the ovary to some extent; (5) *stigma* capitellate; (6) *style* short, erect, glabrous; *filaments* short, glabrous. This species is unusual in that it shows almost complete reduction of its staminodes, in that the apical gland on the anther is minutely stipitate and in that the ovary is reduced to 2 carpels. These atypical characters do not really serve to place this species into either *Diosma* with no staminodes, *Adenandra* with stipitate anther glands or even into *Agathosma* which contains some 2-carpellate species.

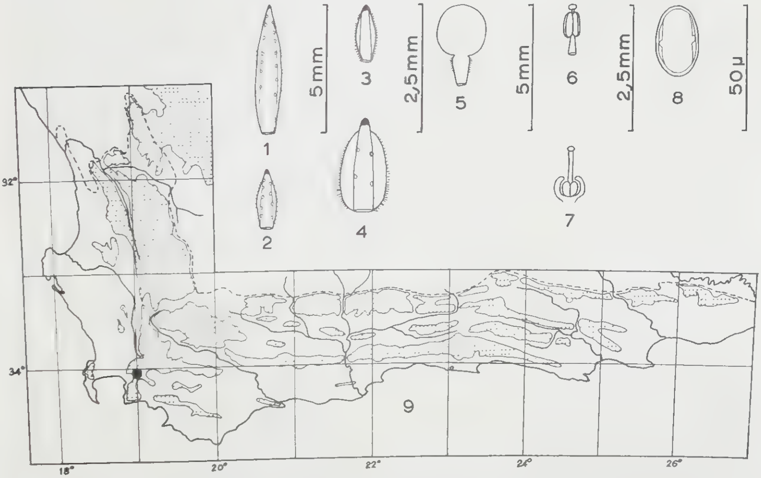

FIG. 12.
Acmadenia candida: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium with section of disc. 8, pollen. 9, distribution.

Acmadenia candida is closest to *Acmadenia nivea* which however has staminodes somewhat less reduced and an ovary with 3 or 4 carpels.

Acmadenia candida is recognised as distinct on account of being an extremely slender glabrous plant with few branches, with white petals, with reduced staminodes, with anthers minutely stipitate-glandular and with a 2-carpellate ovary. The name alludes to the strikingly white petals.

Macrostylis ramulosa Williams, sp. nov. propria propter ramos ad basin ramulosos, folia lineari-lanceolata pubescentia ecostata, bracteas 2,5–4,5 mm longas pubescentes, bracteoles et sepalia ad apices pubescentes, fructum pubescentem.

Frutex inferior, 300 mm, sub-decumbens, ad basin monocaulis. *Rami* subdecumbentes, glabrescentes, ad basin ramulosi. *Ramuli* numerosi erectiusculi, foliosi, sparsim pubescentes. *Folia* 6–8 mm longa, 1,2 mm lata, lineari-lanceolata, acuta, erecta, sessiles, alterna, pubescentia, ecostata, indistincte glanduloso-punctata. *Inflorescentia* terminalis, 5–6 aggregata; *flos* 5 mm diam., albus. *Bractea* 2,5–4,5 mm longa, 0,8–1 mm lata, similis folio. *Bracteolae* duae, 1,6–2 mm longae, 0,6 mm latae, oblongae, sub-acutae, apicibus caespitosis, ad basin translucentes. *Sepala* quinque, 3 mm longa, 1 mm lata, anguste lanceolata, ciliata, ad basin translucentia, apicibus pubescentibus. *Petala* quinque, 5 mm longa, alba; *limbus* 1,4 mm latus, patens, sub-orbicularis; *unguis* 1,2 mm latus barbatus, eciliatus. *Staminodia* quinque, 0,3 mm longa, saepe vix visibilia. *Filamenta* quinque, post anthesin 6–7 mm longa, glabra. *Antherae* quinque, 1,2 mm longae, 0,7 mm latae, oblongae, flavidae, apicibus minute glandulosis. *Pollen* 52 μ longum, 22 μ latum, oblongum. *Discus* ovarium includens, stylus ad basin cingens, viridus, nectarifer. *Stigma* simplex, terminale. *Stylus* 6 mm longus, glaber. *Ovarium* 3-carpellatum, 0,6 mm longum, globosum, glabrum. *Fructus (Williams 2261)* 3-carpellatus, fere abortu 1-carpellatus, 12 mm longus, 3 mm latus, pubescens, rubro-glanduloso-punctatus, cornibus erectis, gracilibus. *Semen* 4,2 mm longum, 1,8 mm latum, arilatum, piceum, impolitum.

Type: CAPE—3219 (Clanwilliam): north facing gravelly slopes, Middelberg Pass near Kleinplaas, Citrusdal (-CA), 777 m (2 550 ft.), 12/7/1975, *Williams 2017* (NBG, holotype; BOL, K, M, MO, PRE, S, STE, isotypes).

Stokoe collected this plant twice during 1940 and thereafter again in 1945, 1950 and 1955. In spite of its rather distinct hairy appearance it has remained undescribed until now.

Undershrubs 300 mm tall, semi-decumbent, arising from a single stem almost below ground level. *Branches* tending to sprawl, glabrescent, greyish-brown, with small leaf scars. *Branchlets* numerous, fairly erect, sparsely pubescent, well clothed with leaves, many sprout from the older wood. *Leaves* 6–8 mm long, 1,2 mm broad, linear-lanceolate or subulate, incurved-erect, sessile, alternate, apex

pubescent and acute without any callus, ciliate almost without any hyaline margins; adaxial surface glabrous, concave; abaxial surface pubescent with scattered long hairs, round backed with many indistinct gland dots scattered mainly towards the midrib. *Inflorescence* terminal, 4–6 aggregate; flowers 5 mm diam., white. *Bract* 2,5–4,5 mm long, 0,8–1 mm broad, the inner smaller, similar to the leaf but with broad translucent margins towards the base. *Bracteoles* two, 1,6–2 mm long, 0,6 mm broad, oblong, apex sub-acute and tufted with bristly hairs, ciliate above, margins broad and translucent. *Calyx lobes* five, 3 mm long, 1 mm broad, narrowly lanceolate, apex a blunt hairy point, ciliate, margins translucent below. *Petals* five, 5 mm long, white; *limb* 1,4 mm broad, ovate, sub-acute, spreading; *claw* 1,2 mm broad, crisped-bearded above in the centre, eciliate. *Staminodes* five, 0,3 mm long, slender with a minute apical gland, arising at the outside base of the disc at the base of the petal, in many cases almost invisible. *Filaments* five, glabrous, becoming 6–7 mm long after anthesis. *Anthers* five, 1,2 mm long, 0,7 mm broad, yellow, oblong with a small apical gland. *Pollen* 52 μ long, 22 μ broad, oblong. *Disc* green, envelops the ovary, touching the base of the style, exudes nectar. *Stigma* simple, terminal. *Style* becoming 6 mm long, glabrous, pink at the tip. *Ovary* 3-carpellate, 0,6 mm diam., globose, glabrous. *Fruit* (from *Williams 2261*) 3-carpellate with normally only one carpel developing, 12 mm long, 3 mm broad, pubescent, reddish gland-dotted; *horns* 5 mm long, erect, slender. *Seed* 4,2 mm long, 1,8 mm broad, truncate with the aril extending 1,3 mm, black, matt.

SPECIMENS EXAMINED

CAPE—3219 (Clanwilliam): waterfalls between Citrusdal and Elandskloof (-CA), 3/8/1940, *Stokoe 8181* (BOL); west end of Elandskloof above Citrusdal, 5/10/1946, *Esterhuysen 13018* (BOL); Elandskloof, -/12/1940, *Stokoe s.n.* (SAM *58851*), 26/3/1951, *Compton 22696* (NBG), 27/8/1954, *Lewis 4730* (SAM); north facing gravelly slopes, Middelberg Pass near Kleinplaas, Citrusdal, 777 m (2 550 ft.) 12/7/1975, *Williams 2017* (NBG, BOL, K, M, MO, PRE, S, STE); Cedarberg, Duivelskop, 2 500–3 500 ft., -/1/1945, *Stokoe s.n.* (BOL, SAM *58812*); Duivelskloof, -/9/1950, *Stokoe s.n.* (SAM *64158*).

DISTRIBUTION AND BIOLOGY

Macrostylis ramulosa has been found only in a fairly small area, about 12 km in length, in the mountains to the east of Citrusdal in the Clanwilliam Division. It grows on gravelly-sandy soil derived from the Table Mountain series at altitudes of around 777 m (2 500 ft.) on north facing slopes. Flowers have been seen from March to September and fruits in December and January.

The disc exudes nectar which rises between the lower parts of the style and the filaments by capillary action. The small flowers are made more obvious by being aggregated into groups of 4 to 6. By the time that the anthers shed their pollen they have been carried far beyond the throat of the flower and likewise, at a later stage when all the pollen has been shed, the style with the receptive stigma protrudes a long way. With the above facts in mind it would appear therefore that this plant is insect pollinated. Regeneration after fires seems to take place only from seed and not at all by coppicing from the root. The leaves have a very faint smell of cedar when crushed.

DISCUSSION

This species falls quite naturally into the genus *Macrostylis* of Bartling and Wendland. The following characters, besides being typical of the genus, also help to exclude it from some other genus of the *Diosmeae*: (1) *heads* up to 6 aggregate; (2) *petals* with a dense shaggy pubescence at the throat; (3) *staminodes* vestigial, at most 0,3 mm long; (4) *anthers* with a minute apical gland; (5) *disc* closes over the ovary almost touching the base of the style; (6) *stigma* simple; (7) *style* and *filament* glabrous, protruding a long way; (8) *ovary* 3-carpellate.

Macrostylis ramulosa is recognised as distinct on account of being a semi-decumbent shrub with many branchlets sprouting towards the base, with linear-lanceolate pubescent leaves without any prominent midrib, with pubescent bracts 2,5–4,5 mm long, with bracteoles and calyx lobes pubescent at their tips, and with the fruit pubescent. It is nearest to *M. decipens* which is a much more glabrous plant with the ability to coppice from the root after fires

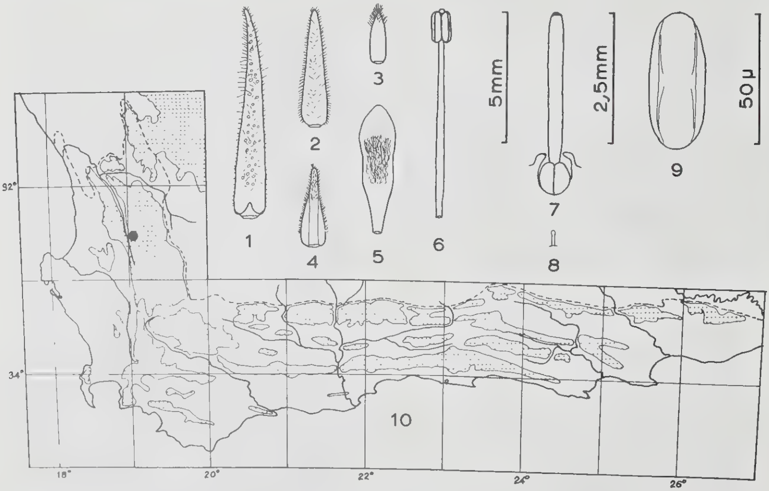

FIG. 13.
Macrostylis ramulosa: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium with section of disc. 8, staminode. 9, pollen. 10, distribution.

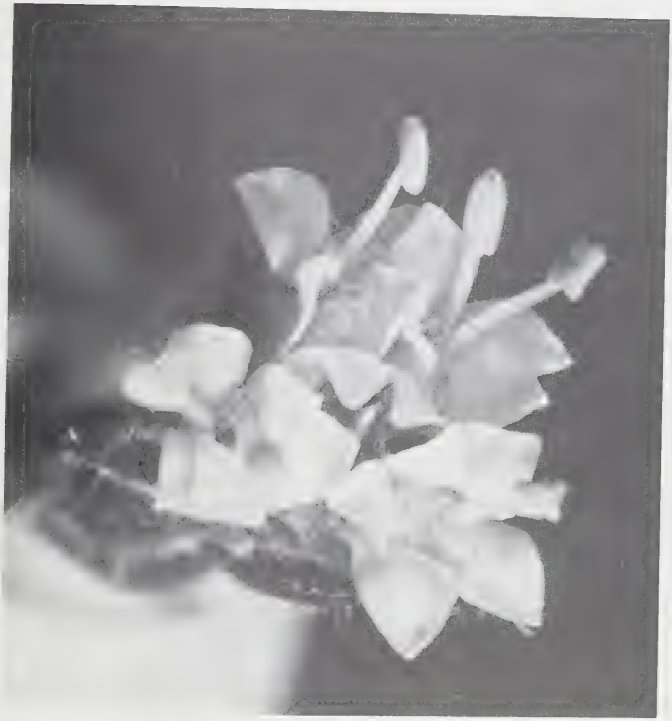

Fig. 14.
Macrostylis ramulosa showing bearded petals and protruding filaments.

Acmadenia wittebergensis (Compton) Williams, comb. nov.
Diosma wittebergensis Compton in *Trans.R.Soc.S.Afr.* **19.**3: 297 (1931). *Type*: 3320 (Montagu): Witteberg (Whitehill), south slope, Laingsburg Division (-BC), 1 067 m (3 500 ft.), 11/8/1924 *Compton 2524* (BOL, lectotype).

This plant was discovered by Professor R. H. Compton during the period 1923 to 1929 when he was making collections, in the vicinity of the Karoo Garden at Whitehill near Matjiesfontein, for his "Flora of the Whitehill District". Late in 1974 E. G. H. Oliver found the same plant on the Roodeberg in the Little Karoo near Ladismith. Examination of this material conveyed the impression that this species might be more satisfactorily placed in *Acmadenia* and fresh material was therefore collected (*Williams 2132*) to be used as the basis for the following description.

Shrubs up to 500 mm tall with many stems arising from a persistent rootstock.

Branches erect, stiff, 2–3 chotomous; *bark* greyish-brown, rough with leaf scars. *Branchlets* erect, stiff, short, puberulous, brownish, 2–3 chotomous, leafy. *Leaves* 11–13 mm long including petiole 1,5 mm long, 1,6–1,9 mm broad, linear-lanceolate, incurved-erect, alternate, crowded, loosely imbricate; adaxial surface, lower part of abaxial surface and petiole all puberulous; abaxial surface rounded, lumpy with two rows of gland dots, scabrid above; apex tapering to a pungent mucro; base narrowing to a short decurrent petiole; margins rounded, scabrid-ciliate. *Inflorescence* terminal, ± 5 aggregate in a much reduced raceme of which several flowers may abort, base somewhat surrounded by the uppermost leaves; *flowers* 9 mm diam., white, opening in succession, crowded. *Bract* one to each flower, 2,5–4,5 mm long, uppermost shortest, 1 mm broad, lanceolate-subulate, incurved, with a pungent mucro, erect-pubescent on all sides, round-backed with 2 rows of gland dots. *Bracteoles* two, 1 mm long, 1,1–1,3 mm broad, deltoid-orbicular, obtuse, 2–4 gland-dotted, pubescent on both surfaces, margins shaggy-ciliate. *Calyx lobes* five, 2,5–2,7 mm long, 1,6–2 mm broad, broadly lanceolate, acute with a small mucro, pubescent on both surfaces, obscurely gland-dotted, shaggy-ciliate, reddish. *Petals* five, 5,8 mm long, 2,7–2,9 mm broad, elliptic, white, glabrous, recurved, 7 gland-dotted in 2 rows, margins irregularly serrate, clawed. *Staminodes* five, 0,5 mm long, conical, spreading-erect, arising close to the petal on the perimeter of the disc. *Filaments* five, becoming 1,5 mm long, glabrous, acicular, incurved. *Anthers* five, before anthesis 1,3 mm long overall, 0,9 mm broad, very dark red, produced upwards into a thickish support to the apical gland which produces an exudate before the bud opens. *Pollen* 40 μ long, 30 μ broad, sub-spherical. *Disc* thick, purplish, minutely pitted, sinuate, almost level equalling and closely surrounding the ovary, exudes nectar. *Stigma* 0,3 mm diam., globose, capitellate, very dark red. *Style* becoming 1,2 mm long, glabrous, persisting, slightly deflexed. *Ovary* 5-carpellate, 1 mm long, 1,2 mm diam., glabrous; apices glandular-globose. *Fruit* 5-carpellate, 8 mm long, 9 mm diam., green with purplish tips, multi-gland-dotted; *horns* extremely short, truncate, apex emarginate clasping an immersed gland; *calyx lobes* persisting. *Seed* 6 mm long, 2,8 mm broad, black, shining, aril large and white.

SPECIMENS EXAMINED

CAPE—3320 (Montagu): Witteberg (Whitehill), south slope Laingsburg Division (-BC), 3 500 ft., 11/8/1924, *Compton 2524* (BOL); Witteberg, summit, 5 000 ft., 21/5/1925, *Compton 2951* (BOL); Witteberg near Whitehall, north slope, 4 000 ft., 24/10/1943, *Compton 15248* (BOL, NBG); Anysberg, rocky north slopes, 3 000–3 500 ft., 19/4/1941, *Stokoe 8187* (BOL, PRE, NBG, SAM 56858), 20/5/1972, *Esterhuysen 32860* (PRE); Anysberg, south slopes (-DA), 2 500 ft., 2/8/1956, *Wurts 1418* (NBG); Touwsberg, ridge on south slopes (-DB), 3 000–4 000 ft., *Esterhuysen 25884* (BOL, NBG); Prinspoortberg, Little Karoo (-BD), 4 000 ft., -/7/1937, *Levyns 6159* (SAM).

——3321 (Ladismith): ridge between Rooiberg and Bailey Peak (-CB), 4 500 ft., 11/11/1974, *Oliver 5429* (STE, PRE); Bailey Peak, Rooiberg, north slopes, 4 300/4 800 ft., 2/11/1975, *Williams 2132* (NBG).

DISTRIBUTION AND BIOLOGY

Acmadenia wittebergensis has been found at altitudes of from 900–1 500 m (3 000–5 000 ft.) above sea level growing on dry rocky slopes in quartzitic soil derived from the Witteberg and Table Mountain series. The distribution is discontinuous with populations, showing little or no variation, situated on isolated quartzitic mountains. The surrounding land consisting of softer shales of the Bokkeveld series has been weathered down to much lower levels. As one cannot imagine any method of dispersal which could possibly bridge these gaps at the present time, one is forced to the conclusion that this species, in its present form, may have been in existence for a very long time. Plants from the Rooiberg seem to have leaves with long sharp points. The conspicuous white petals in the flower heads and the presence of nectar indicate that this plant is most probably insect pollinated. The seeds when ripe are ejected from the capsule by the usual catapult mechanism but regeneration after fires would appear to take place mainly by regrowth from a persistent rootstock. One fairly large plant, with about 50 stems, showed at least four episodes in the branching at the base indicating four past

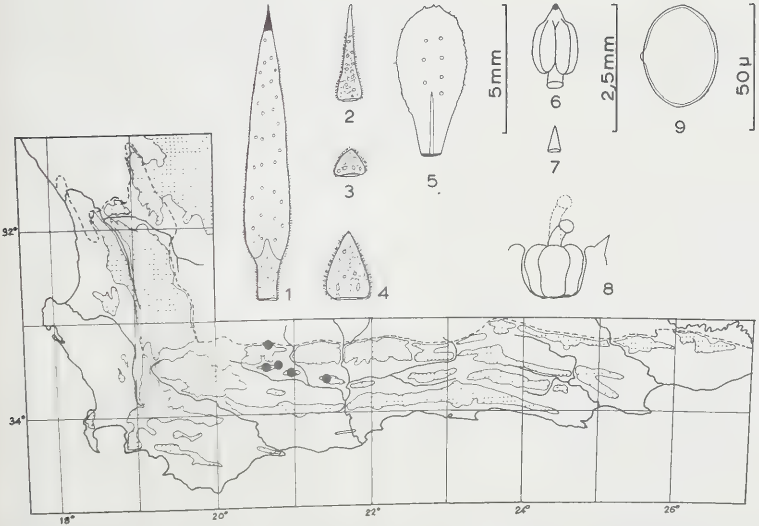

FIG. 15.

Acmadenia wittebergensis: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, staminode. 8, gynoecium with section of disc. 9, pollen. 10, distribution.

destructions by fire. A vigorous young branchlet, springing from the base, may be quite long, densely clothed with leaves and bear a cluster of twelve flowers at the apex. The flowers are sweet smelling. The leaves have a resinous smell when crushed and the fruits a smell of celery when crushed.

This plant has been transferred to the genus *Acmadenia* because of having its petals clawed (the claws more or less form a tubular perianth 4 mm long above which the blades of the petals bend outwards), also because of having pointed staminodes and a pointed gland at the apex of each anther; the disc does not spread widely with a crenulate margin as in *Diosma* but surrounds the ovary rather closely and is almost level on top. Other factors which exclude *Acmadenia wittebergensis* from other genera of the *Diosmeae* are: (1) *petals* without any beard; (2) *stigma* capitellate; (3) *style* and *filaments* short and glabrous; (4) *ovary* 5-carpellate.

Acmadenia wittebergensis is recognised as being distinct because of having thick pointed crowded leaves, pubescent bracts, bracteoles and calyx lobes, short conical staminodes with conical glands on the anthers and a multi-stemmed habit. It appears to have no very close resemblance to any other species of *Acmadenia*. At best one may say that it is nearest to *A. teretifolia* which Phillips also transferred to *Diosma*.